

## CLAIMS

We claim:

1. A method of identification and quantification of aldehyde(s) and/or ketone(s) in a sample comprising the steps of:
  - a) combining a known amount of an oxime internal standard with said sample comprising said aldehyde and/or ketone ;
  - b) contacting said sample with an alkoxyamine to convert said aldehyde and/or ketone in said sample into an oxime of identical structure as that of said oxime internal standard except for the stable isotope atoms;
  - c) extracting said sample to isolate said oxime and said oxime internal standard; and
  - d) analyzing said oxime and said oxime internal standard by mass spectrometry.
2. The method of claim 1 wherein said mass spectrometric method is the isotope dilution mass spectrometric method using isotope labeled internal standard.
3. The method of claim 1 wherein said aldehyde and/or ketone is an aldehyde and/or ketone having the following formula  $R_1CHO$  or  $R_1R_2CO$  wherein  $R_1$  and  $R_2$ , are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups.
4. The method of claim 1 wherein said oxime internal standard is a stable isotope labeled internal standard.
5. The method of claim 1 wherein said oxime internal standard is synthesized by reacting an authentic sample of said aldehyde and/or ketone with a stable isotope labeled reagent to form said oxime internal standard having the following formula  $R_1CH=NOR_3$  or  $R_1R_2C=NOR_3$ , wherein  $R_3$  is a stable isotope labeled alkyl group.

6. The method of claim 5 wherein said labeled group  $R_3$  is selected from a group consisting of  $CD_3$  and  $C_6D_5$ , formed by reacting said aldehyde and/or ketone with labeled alkoxyamine selected from a group comprising labeled methoxyamine and labeled benzyloxyamine.
7. The method of claim 1 wherein said extraction step c) can be any appropriate separating methods such as solid phase extraction, liquid-liquid extraction or solid supported liquid-liquid extraction.
8. The method of claim 1 wherein said alkoxyamine is selected from a group consisting of methoxyamine and benzyloxyamine.
9. The method of claim 1 wherein said sample contains either a singularity or a plurality of aldehyde and/or ketone.
10. The method of claim 1 wherein said multiple aldehydes and/or ketones can be converted to said oximes using a single alkoxyamine.
11. The method of claim 1 wherein said multiple labeled oxime internal standards can be synthesized from said aldehydes and/or ketones using a single labeled alkoxyamine.
12. The method of claim 1 wherein there is no conversion of said stable isotope labeled oxime internal standard to its corresponding non-labeled oxime compound during step b).
13. The method of claim 1 wherein said converting step b) is performed in an aqueous environment.
14. The method of claim 1 wherein said converting step b) is performed before the extraction step.
15. The method of claim 1 wherein said converting step b) is quantitative.
16. A method of identification and quantification of aldehyde(s) and/or ketone(s) in a sample comprising the steps of:

- a) combining a known amount of a hydrazone internal standard with said sample comprising said aldehyde and/or ketone ;
  - b) contacting said sample with an alkylhydrazine to convert said aldehyde and/or ketone in said sample into a hydrazone of identical structure as that of said hydrazone internal standard except for the stable isotope atoms;
  - c) extracting said sample to isolate said hydrazone and said hydrazone internal standard; and
  - d) analyzing said hydrazone and said hydrazone internal standard by mass spectrometry.
17. The method of claim 16 wherein said mass spectrometric method is the isotope dilution mass spectrometric method using isotope labeled internal standard.
18. The method of claim 16 wherein said aldehyde and/or ketone is an aldehyde and/or ketone having the following formula  $R_1CHO$  and  $R_1R_2CO$  wherein  $R_1$  and  $R_2$  are alkyl, aryl, and heteroatom containing cyclic or non-cyclic groups.
19. The method of claim 16 wherein said hydrazone internal standard is a stable isotope labeled internal standard.
20. The method of claim 16 wherein said hydrazone internal standard is synthesized by reacting an authentic sample of said aldehyde and/or ketone with a stable isotope labeled reagent to form said hydrazone internal standard having the following formula  $R_1CH=NNHR_3$  or  $R_1R_2C=NNHR_3$  , where  $R_3$  is a stable isotope labeled alkyl group.
21. The method of claim 20 wherein said labeled group  $R_3$  is selected from a group consisting of  $CD_3$  and  $C_6D_5$  , formed by reacting said aldehyde and/or ketone with labeled alkylhydrazine selected from a group comprising labeled methylhydrazine and labeled benzylhydrazine.

22. The method of claim 16 wherein said extraction step c) can be any appropriate separating methods such as solid phase extraction, liquid-liquid extraction or solid supported liquid-liquid extraction.
23. The method of claim 16 wherein said alkylhydrazine is selected from a group consisting of methylhydrazine and benzylhydrazine.
24. The method of claim 16 wherein said sample contains either a singularity or a plurality of aldehyde and/or ketone.
25. The method of claim 16 wherein said multiple aldehydes and/or ketones can be converted to said hydrazones using a single alkylhydrazine.
26. The method of claim 16 wherein said multiple labeled hydrazone internal standards can be synthesized from said aldehydes and/or ketones using a single labeled alkylhydrazine.
27. The method of claim 16 wherein there is no conversion of said stable isotope labeled hydrazone internal standard to its corresponding non-labeled hydrazone compound during said converting step b).
28. The method of claim 16 wherein said converting step b) is performed in an aqueous environment.
29. The method of claim 16 wherein said converting step b) is performed before said extraction step.
30. The method of claim 16 wherein said converting step b) is quantitative.